CLAIMS

What is claimed is:

1. A method for applying substances to a support, more especially monomers for the combinatorial synthesis of molecule libraries, wherein

- the substances (2) are first embedded in a matrix (3) includes at least one solvent (4), that at a temperature of <90 °C, preferably at a temperature of <50 °C exists in the solid state of aggregation (7),
- wherein the substances (2) embedded in the matrix (3) including at least one first solvent (4) form transport units (5) which are moved (6) as units,
- wherein the transport units (5) are then applied (6) to the support (1) at a temperature of <90 °C, preferably at a temperature of <50 °C in the solid state of aggregation (7), or that said transport units (5) are dissolved by a second solvent component (12) and at said temperatures are applied (6) to the support (1) in the liquid state of aggregation (13) where, after the complete or partial vaporisation of said second solvent component (12) they take on a solid or gel-like state of aggregation (7),
- wherein the transport units (5) remain in a solid or gel-like state of aggregation (7) after application to a support (1),
- wherein the substances (2) dissolved in the first solvent, which are located on the support (1), are then mobilised (9) by modifying the physical environment (8), more especially within said first solvent (4),
- wherein the substances (2, 9) thus mobilised enter the vicinity of the support surface (10) by means of a physical process,
- wherein the substances (2, 9) thus mobilised link covalently to molecules located on the support (1), or enter into a chemical reaction with these or catalyse these,
- wherein the substances (11) thus mobilised and linked covalently to the support are or yield many different substances (2),

- wherein more than one layer of said substances (2) is applied repeatedly one after the other to the support (1) in precise positions, in each case followed by the covalent linking of the substances to the support (11) and washing away non-linked substances.

2. The method of claim 1, wherein the said substance (2) at a temperature of <90 °C, preferably at a temperature of <50 °C, occurs immobilised in particles having sizes between 0.2 µm and 200 µm, preferably between 2 µm and 40 µm.

3. The method of claim 1, wherein until the start of the linking reaction (10, 11) of said monomers to the support (1), said support (1) is held at a temperature at least 10 °C lower compared with said transport unit (7, 13).

4. The method of claim 1, wherein the locally precise transfer of substances takes place with the aid of a suitably modified printing method, more especially with the aid of a laser printer, a laser copier or an ink jet printer.

5. The method of claim 1, wherein the locally precise transfer of substances takes place with the aid of a number of purposefully controllable light sources, more especially with the aid of an array of light-emitting diodes or microlasers.

6. The method of claim 1, wherein the particles to be applied to the support are sprayed over the support.

7. The method of claim 1, wherein the particles on the support are cooled and deep-frozen.

8. The method of claim 1, wherein the particles contain at least one element from the following group or bind to such particles that contain an element from the following group: magnetic constituents, diphenyl formamide, preliminary stages for monomers, dimers or trimers suitable for combinatorial synthesis, more especially preliminary stages of D or L amino acids, of nucleosides or of derivatised nucleosides or of their mirror images or their derivatives or polystyrene or cellulose, more especially polystyrene or cellulose to which one or several layers of monomers are linked.

9. The method of claim 1, wherein after a first cycle of linking reactions protective groups are detached by standard methods such that preferably free amino groups or hydroxyl groups occur to which preliminary stages of monomers, dimers or trimers can link.

10. A method for applying substances to a support, especially monomers for the combinatorial synthesis of molecule libraries, wherein electromagnetic waves, more especially laser light, are directed repeatedly, in precise positions, onto selected regions of the support, such that the selected regions of the support are charged or become charged with various molecules or with various aggregates of these molecules, the various molecules or aggregates of these molecules interact, the various molecules or aggregates of these molecules or the other molecules located on the selected regions interact with the incident electromagnetic waves, and by means of the interaction of the incident electromagnetic waves with the molecules or with aggregates of these molecules or with other molecules, they set in motion local physical or chemical processes.

11. A device for applying molecules to an essentially flat surface of a support, including means for mounting the support such that it can be rotated about an essentially perpendicular axis of rotation to said surface of the support, means for applying various fluids to the surface of the support in the region of the axis of rotation and at least one laser which can be moved relative to the support to irradiate the selected regions of the support with laser light.

12. A device for applying molecules to an essentially flat surface of a support, including nozzle-like means for applying minute quantities of molecules to be anchored on the support, means for displacing the means for applying the molecules and the support relative to each other and at least one laser to irradiate the selected regions of the support with laser light.

13. A device for applying molecules to an essentially flat surface of a support, including a container for the particles containing the molecules to be applied, a laser, and means for moving the support and the laser relative to one another.

14. The device of claim 13, wherein this device is a modified but otherwise essentially commercially available laser printer or laser copier in which the toner particles are replaced by the particles containing the molecules to be applied.

15. A method for applying substances to a support, more especially monomers for the combinatorial synthesis of molecule libraries, wherein

— the substances (2) are first embedded in a matrix (3) including at least one solvent (4), that at a temperature of <90 °C, preferably at a temperature of <50 °C exists in the solid state of aggregation (7),

— wherein the substances (2) embedded in the matrix (3) including at least one first solvent (4) form transport units (5) which are moved (6) as units,

— wherein the transport units (5) are then applied (6) to the support (1) at a temperature of <90 °C, preferably at a temperature of <50 °C in the solid state of aggregation (7),

— wherein the transport units (5) remain in a solid or gel-like state of aggregation (7) after application to a support (1),

— wherein the substances (2) dissolved in the first solvent, which are located on the support (1), are then mobilised (9) by modifying the physical environment (8), more especially within said first solvent (4),

— wherein the substances (2, 9) thus mobilised enter the vicinity of the support surface (10) by means of a physical process,

— wherein the substances (2, 9) thus mobilised link covalently to molecules located on the support (1), or enter into a chemical reaction with these or catalyse these,

— wherein the substances (11) thus mobilised and linked covalently to the support are or yield many different substances (2),

— wherein more than one layer of the substances is applied repeatedly one after the other to the support (1) in precise positions, in each case followed by the covalent linking of the substances (2) to the support (11) and washing away non-linked substances.

16. The method of claim 15, wherein the substance (2) at a temperature of <90 °C, preferably at a temperature of <50 °C, occurs immobilised in particles having sizes between 0.2 µm and 200 µm, preferably between 2 µm and 40 µm.

17. The method of claim 15, wherein until the start of the linking reaction (10, 11) of said monomers to the support (1), said support (1) is held at a temperature at least 10 °C lower compared with said transport unit (7, 13).

18. The method of claim 15, wherein the locally precise transfer of substances takes place with the aid of a suitably modified printing method, more especially with the aid of a laser printer or a laser copier.

19. The method of claim 15, wherein the locally precise transfer of substances takes place with the aid of a number of purposefully controllable light sources, more especially with the aid of an array of light-emitting diodes or microlasers.

20. The method of claim 15, wherein the particles to be applied to the support are sprayed over the support.

21. The method of claim 15, wherein the particles on the support are cooled and deep-frozen.

22. The method of claim 15, wherein the particles contain at least one element from the following group or bind to such particles that contain an element from the following group: magnetic constituents, diphenyl formamide, preliminary stages for monomers, dimers or trimers suitable for combinatorial synthesis, more especially preliminary stages of D or L amino acids, of nucleosides or of derivatised nucleosides or of their mirror images or their derivatives or polystyrene or cellulose, more especially polystyrene or cellulose to which one or several layers of monomers are linked.

23. The method of claim 15, wherein after a first cycle of linking reactions protective groups are detached by standard methods such that preferably free amino groups or hydroxyl groups occur to which preliminary stages of monomers, dimers or trimers can link.

24. The method of claim 15, wherein polystyrene films, paper, CDs, MODs, DVDs or FMDs are used as supports.

25. The method of claim 15, wherein the immobilised substances (toner particles) are moved by applying an electrical voltage.

26. A method for applying substances to a support, wherein electromagnetic waves, more especially laser light, are directed repeatedly, in precise positions, onto selected regions of the support, such that the selected regions of the support are charged or become charged with various molecules or with various aggregates of these molecules, the various molecules or aggregates of these molecules interact, the various molecules or aggregates of these molecules or the other molecules located on the selected regions interact with the incident electromagnetic waves, and by means of the interaction of the incident electromagnetic waves with the molecules or with aggregates of these molecules or with other molecules, they set in motion local physical or chemical processes.

27. A device for applying molecules or substances onto an essentially flat surface of a support, comprising means for mounting the support such that it can be rotated about an axis of rotation essentially perpendicular to the surface of the support, means for applying various fluids to the surface of the support in the region of the axis of rotation and at least one laser which can be displaced relative to the support to irradiate the selected regions of the support with laser light.

28. A device for applying molecules or substances to an essentially flat surface of a support, comprising nozzle-like means for applying minute quantities of molecules to be anchored on the support, means for displacing the means for the application of the molecules and the support relative to each other and at least one laser to irradiate the selected regions of the support with laser light.

29. A device for applying molecules or substances to an essentially flat surface of a support, including a container for the particles containing the molecules to be applied, a laser, and means for moving the support and the laser relative to one another.

30. The device of claim 29, wherein this device is a modified but otherwise essentially commercially available laser printer or laser copier in which the toner particles are replaced by the particles containing the molecules to be applied.

31. The device of claim 30, wherein a feedback device adjusts the support roller or a support unit (of the laser printer) in relation to the (laser-) writable roller.

32. The device of claim 31, wherein the spatial relationship is produced repeatedly time after time by the feedback device, whereby this spatial reproducibility is also bob-system-specific, that is it functions between various laser printers.

33. The device of claim 31, wherein the feedback device uses a grid of position markings which are applied to the support, the support roller or the transfer unit.

34. The device of claim 33, wherein the feedback device corrects the deviation of the position markings with respect to a previously stored grid by electronically shifting the pixels in the printer memory.

35. The device of claim 31, wherein the feedback mechanism is accomplished by exact mechanical linking.

36. The device of claim 31, wherein the feedback device is accomplished both mechanically and electronically.